Atty. Docket No.: NNEX0012C Serial No.:10/717, 813

Applicant: Mok et al Examiner:

Unassigned

TRUNG NGUY EN

Filing Date: November 19, Group: 2829

U.S. Patent Documents

Examine		-				Sub-	Filing
Initial	No.	Patent No	Date	Patentee	Class	class	Date
29	1	2002/0016	2/7/02	Fork et al.	439	81	7/27/01
		2002/0013	1/31/02	Fork et al.	439	66	8/6/01
		2003/0010	1/16/03	Fork et al.	200	262	7/11/01
		3,806,800	4/23/74	Bove, et al.	324	51	12/26/72
	1	3,806,801	4/23/74	Bove	324	42.5	12/26/72
		3,810,017	5/7/74	Wiesler, et al.	324	158	5/15/72
		3,835,381	9/10/74	Garretson, et al.	324	158	8/9/73
	1	3,842,189	10/15/74	Southgate	174	52	1/8/73
		3,842,189		Southgate	174	52	1/8/73
		3,939,414	2/17/76	Roch	324	158	1/28/74
		3,939,414		Roch	324	125	1/28/74
		4,177,425	12/4/79	Lenz	324	158	9/6/77
		4,195,259	3/25/80	Reid, et al.	324	158	4/4/78
		4,201,393	5/6/80	Lee, et al.	324	158	6/26/78
		4,214,201	7/22/80	Kern	324	158	2/24/78
			3/16/1982	Ibrahim, et al.	361	764	5/15/1980
	1	4,362,991		Carbine	324	158	12/12/80
	1	4,423,376		Byrnes, et al.	324	158	3/20/81
			12/27/1983	Mueller	337	107	7/21/1982
	1	4,480,223	10/30/84	Aigo	324	158	11/25/81
		4,518,910		Hottenrott, et al.	324	158	6/30/83
		4,567,432		Boul, et al.	324	158	6/9/83
		4,599,559		Evans	324	158	7/22/85
		4,622,514	11/11/86	Lewis	324	158	6/15/84
		4, 636,722	1/13/87	Ardezzone			5/21/84
		4,647,852	3/3/87	Smith, et al.	324	158	9/25/85
		4,667,154	5/19/87	Allerton, et al.	324	158	6/26/85
		4,686,464	8/11/87	Elsasser, et al.	324	158	6/3/85
		4,716,500	12/29/87	Payne	361	398	10/18/85
		4,719,417	1/12/88	Evans	324	158	4/11/86
		4,758,927	7/19/1988	Berg	361	761	1/21/1987
		4,816,754	3/28/89	Buechele, et al.	324	158	4/29/86
		4,837,622	6/6/89	Whann, et al.	324	158	6/22/88
		4,908,571	3/13/90	Stoehr	324	158	4/19/88
		4,956,923	9/18/90	Pettingell, et al.	324	558	11/6/89
	I	4,973,903	11/27/90	Schemmel	324	158	11/8/89
		4,975,638	12/4/90	Evans, et al.	324	158	12/18/89
		5,055,778		Okubo et al.	324	158	7/5/90
	<u> </u>	5,055,778	10/8/91	Okubo et al.	324	158	7/5/90
		5,070,297		Kwon, et al.	324	158	6/4/90
₩		5,084,672	1/28/92	Ikeuchi, et al.	324	158	2/20/90

28	5,121,298 6/9/1992		361	774	7/13/1990
0.	5,144,228 9/1/92	Soma, et al.	324	158	4/23/91
	5,152,695 10/6/199		439	71	10/10/1991
	5,166,774 11/24/19	92 Benerji, et al.	361	749	10/5/1990
	5,189,363 2/23/93	Bregman, et al.	324	158	9/14/90
	5,189,363 2/23/93	Bregman et al.	324	158	9/14/90
	5,208,531 5/4/93	Aton	324	158	8/13/90
	5,210,485 5/11/93	Kreiger et al.	324	158	7/26/91
	5,214,375 5/25/93	Ikeuchi et al.	324	158	3/26/92
	5,225,037 7/6/93	Elder et al.	156	644	6/4/91
	5,225,037 7/6/93	Elder et al.	156	644	6/4/91
	5,227,718 7/13/93	Stowers et al.	324	158	3/10/92
	5,255,079 10/19/93		358	37	5/30/91
	5,258,648 11/2/93	Lin	257	778	11/27/92
	5,280,139 1/18/199		174	260	8/17/1992
	5,313,157 5/17/94	Pasiecznik	-		4/29/92
	5,326,428 7/5/94	Farnworth et al.	156	654	9/3/93
	5,354,205 10/11/94		1	1	4/23/93
	5,395,253 3/7/95	Crumly			4/29/93
	5,412,866 5/9/95	Woith et al.	-	-	7/1/93
	5,416,429 5/16/199		324	762	5/23/1994
	5,416,429 5/16/95	McQuade, et al.	324	762	5/23/94
	5,440,241 8/8/95	King et al.	324	765	3/6/92
	5,473,254 12/5/95	Asar	324	537	8/12/94
			228	180.5	11/16/93
	5,476,211 12/19/95	Kimura et al.	324	760	12/14/93
	5,521,523 5/28/96 5,523,697 6/4/96	Farnworth et al.	324	758	3/4/94
			324	754	4/24/95
	5,530,371 6/25/96	Perry et al.	324	760	7/19/94
	5,532,612 7/2/96	Liang		757	05/02/1994
	5,534,784 07/09/19		324		
	5,546,012 8/13/96	Perry et al.	324	754	4/15/94
	5,568,054 10/22/96			700	5/19/95
	5,570,032 10/29/96		324	760	8/17/93
	5,613,861 03/25/97		439	81	06/07/95
	5,621,333 4/15/97	Long et al.	007		5/19/95
	5,621,373 4/15/97	McCormick	337	1	8/14/95
	5,629,631 5/13/97	Perry et al.	324	755	4/24/95
	5,665,648 9/9/97	Little	438	117	12/21/95
	5,694,050 12/2/97	Noguchi			3/8/96
	5,744,283 4/28/98	Spierings et al			12/4/95
	5,764,070 6/9/1998	Pedder	324	754	2/21/1996
	5,772,451 6/30/98	Dozier, II et al.	439	70	10/18/95
	5,786,701 07/28/19	98 Pedder	324	754	04/01/1996
	5,806,181 9/15/98	Khandros et al.	29	874	1/24/97
	5,820,014 10/13/98	Dozier II et al.	228	56.3	1/11/96
	5,821,763 10/13/98		324	754	11/22/96
	5,828,226 10/27/98		324	762	11/6/96
	5,829,128 11/03/19		29	855	11/15/1995
	5,832,598 11/10/98		29	840	11/1/96
	5,832,601 11/10/19		29	843	04/15/1997
	5,844,421 12/1/98	Lee et al.	324	758	5/16/96
	5,847,572 12/08/19		324	755	01/03/1997
	5,848,685 12/15/19		200	275	12/20/1996
*4	5,852,871 12/29/98		29	843	12/11/95

a V	5,864,946	2/2/4000	Eldridge et al	29	843	4/15/1997
29\			Eldridge, et al.	29	043	4/1/96
\sim	5,869,974		Akram, et al.	29	840	04/15/1997
	5,878,486 5,884,395		Eldridge, et al. Dabrowiecki et al.	29	1040	4/4/97
- - -		03/23/1999	Eldridge, et al.	29	843	04/15/1997
	5,886,535		Budnatis, et al.	29	1043	11/8/96
	5, 896,038		Budnatis, et al.	*		11/8/96
		04/27/1999	Eldridge, et al.	438	14	04/15/1997
-+	5,900,738		Khandros et al.	324	761	10/21/96
	5,912,046		Eldridge et al.	429	126.2	5/9/97
		06/22/1999	Smith et al.	430	320	12/20/1996
	5,926,951		Khandros et al.	29	843	10/21/96
	5,944,537		Smith et al.	439	81	12/15/97
		11/02/1999	Eldridge et al.	29	842	11/09/1995
	5,983,493		Eldridge et al.	29	855	4/15/97
	5,994,152		Khandros et al.	436	617	1/24/97
	5,998,228		Eldridge et al.	438	15	4/15/97
	5,998,864		Khandros et al.	257	723	5/27/97
	6,014,032		Maddix et al.	324	762	9/30/97
	6,023,103		Chang et al.	257	781	6/30/98
	6,028,437		Potter	324	757	5/19/97
. 	6,029,344		Khandros et al.	29	874	8/12/98
	6,032,356		Eldridge et al.	29	843	4/15/97
	6,033,935		Dozier, II et al.	438	117	6/30/98
		03/28/2000	Mathieu	205	209	05/21/1998
	6,043,563		Eldridge et al.	257	784	10/20/97
	6,045,396		Tighe	439	493	9/12/97
-+	6,049,976		Khandros	29	843	6/1/95
	6,050,829		Eldridge et al.	439	67	8/28/97
	6,050,829		Eldridge et al.	439	67	8/28/97
	6,064,213		Khandros et al.	324	754	1/15/97
	6,078,186		Hembree, et al.	324	755	12/31/97
	6,078,189		Hembree et al.	324	755	12/31/97
		07/18/2000	Mathieu	205	137	05/21/199
	6,091,256			324	762	3/4/97
		08/29/2000	Long et al. Eldridge, et al.	438	660	06/03/199
		09/05/2000	Soejima, et al	324	754	04/14/199
	6,137,297		McNair et al.	324	754	1/6/99
-	6,169,411		Johnson	324	757	6/2/97
	6,184,053		Eldridge et al.	438	52	5/6/97
	6,184,065		Smith et al.	438	117	3/25/99
++	6,184,699		Smith, et al.	324	762	12/14/98
	6,192,982		Divis et al.	166	187	9/8/98
	6,204,674		Dabrowiecki et al.	324	754	10/31/97
	6,213,789		Chua, et al.	439	81	12/15/99
	6,218,910		Miller	333	33	2/25/99
	6,232,143		Maddix et al.	438	100	11/23/99
	6,246,247		Eldridge et al.	324	761	9/18/98
	6,255,126		Mathieu et al.	438	15	12/2/98
	6,264,477		Smith, et al.	439	66	4/6/00
	6,264,477		Smith et al.	439	66	4/6/00
-++	6,265,888		Hsu	324	760	3/24/99
	6,274,823	9/4 A //\4	Khandros et al.	174	261	10/21/96

Attorney Docket No. NNEX0012C

94	6,290,510 9/18/01	Fork et al.	439	81	7/27/00
	6,292,007 9/18/01	Potter	324	757	9/15/99
h	6,300,783 10/9/01	Okubo et al.	324	761	9/4/98
	6,340,320 1/22/02	Ogawa	439	824	3/11/99
	6,352,454 03/05/2002	Kim, et al.	439	886	10/20/1999
	6,356,098 3/12/02	Akram et al.	324	765	9/10/99
	6,361,331 3/26/02	Fork et al.	439	81	8/6/01
	6,419,500 7/16/02	Kister	439	66	3/8/99
	6,424,166 7/23/02	Henry et al.	324	755	7/14/00
	6,429,671 8/6/02	Duckworth et al.	324	758	11/25/98
	6,439,898 8/27/02	Chua et al.	439	81	2/2801
	6,489,795 12/3/02	Klete, et al.	324	762	5/18/01
	6,501,343 12/31/02	Miller	333	33	3/13/01
	6,509,751 1/21/03	Mathieu, et al.	324	754	3/17/00
	6,520,778 2/18/03	Eldridge, et al.	439	66	2/13/98
	6,525,555 2/25/03	Khandros, et al.	324	765	5/16/00
	6,528,350 03/04/2003	Fork	438	117	05/21/2001
	6,528,984 3/4/03	Beaman et al.	324	158	9/12/97
Va	6,534,856 3/18/03	Dozier, II et al.	257	698	3/27/01

Foreign Patent or Published Foreign Patent Application

Examin	er		Document	Publication	Country or		Sub-	Trans	lation
Initial	·· /	No.	No.	Date	Patent Office	Class	class	Yes	No
n 1	/		0 681 186	11/8/95	EPO	G01R	1/073	X	
- XX	\leftarrow	 	0 802 419 A	10/22/97	EPO	G01R	1/073	x	
<u> </u>	7		2 518 358 A	10/10/81	FR	H05K	13/08	 ^ -	X
	<u> </u>					HUSK	13/06		
			AU 5964196 A	12/11/1996	AU				
			AU 6028796 A	12/11/1996	AU				/
			AU 6377796 A	12/11/1996	AU				
			AU 6635296 A	12/18/1996	AU				
			CN 1171167 A	01/21/1998	CN			<u> </u>	
			CN 1191500 A	08/26/1998	CN				
			CN 1208368 A	02/17/1999	CN				
			EP 0792462 A	09/03/1997	EP		7		
			EP 0792463 A	09/03/1997	EP				
			EP 0792517	09/03/1997	EP				
			EP 0792519 A	09/03/1997	EP				
			EP 0795200 A	09/17/1997	EP				
			EP 0828582 A	03/18/1998	EP				
	-		EP 0837750	04/29/1998	EP	B23K	9	067	X
1			EP 0859686	08/26/1998	EP	1			
		 	EP 0886894	12/30/1998	EP			-	
			EP0731369A2	9/11/96	EPO	1_			
	····	 	FR 2 518 358	6/17/1983?	FR	1		 	X
i			A	0,1,,,1000.	,,,				^
 -		 	JP 10506197 T	06/16/1998	JP	-			Х
		 	JP 10506238 T	06/16/1998	JP		 		X
		 	JP 10510107 T	9/29/1998	JP			 	X
			JP 11126800 A	05/11/1999	JP				X
		 	JP 11506829 T	06/15/1999	JP		 		 ^-
			JP 11508407 T	07/21/1999	JP		 		X
		ļ	JP 11508407 T	12/07/1999	JP	 	 	 	Î
	-	-	JP 11514493 1	03/03/2000	JP		 	 	 x
Į		1	2000067953 A	03/03/2000	JP		ŀ		^
			JP	10/10/2000	JP			 	X
1		1	2000513499 T	10/10/2000	JF				^
		-	JP 2892505 B	05/17/1999	JP			 	X
		 	JP 2968051 B	10/25/1999	JP	 	 	-	Î
		\vdash	JP 3022312 B	03/21/2000	JP		 	 	 ^ -
		-	<u> </u>						~
∤			JP 3058919 B JP 7301642 A	07/04/2000 11/14/1995	JP JP			 	X
		 					 	 	
		 	JP 9281144 A	10/31/1997	JP				
			JP 9508241 T	08/19/1997	JP		ļ	ļ	X
		ļ	JP 9512139 T	02/12/1997	JP VD		<u> </u>		Χ
		<u> </u>	KR 252457 B	04/15/2000	KR				
- 1		1	PCT/US96/080		PCT			 	
		 	18	40/04/4000				<u> </u>	
		<u> </u>	SG 55303 A	12/21/1998	SG	110.15	10/2	 	
Ì			WO 01 48870	7/5/2001	PCT	H01R	13/24	l	
			A2	0/0/04			4'0==	1	
1	1	<u> </u>	WO 01/09623	2/8/01	PCT	G01R	1/073	X	L

Attorney Docket No. NNEX0012C

94	WO 01/09952		PCT				
\(\)	WO 01/09952	2/8/01	PCT	H01L	23/48	Х	
1	WO 01/48818		PCT			X	
	WO 01/98793	12/27/01	PCT	G01R	100	Х	
	WO 95/14314	5/26/95	PCT	H01R	9/00	X	
	WO 96/15458	5/23/96	PCT	G01R	1/073	X	
	WO 96/15551	5/23/96	PCT	H01L	21/60	X	
	WO 96/16440	5/30/96	PCT	H01L	23/12	X	
	WO 96/17378	6/6/96	PCT	H01L	21/60	X	
	WO 96/37332	11/28/96	PCT	B23K	31/02	X	
	WO 96/38858	12/5/96	PCT	H01L		X	
	WO 96/15459	05/23/1996	PCT				
	Α	1					
	WO 96/37331	11/28/1996	PCT				
1	A						
	WO 96/41506	12/19/1996	PCT				
	Α						
	WO 97/44676	11/27/97	PCT	G01R	1/067	X	
	WO 98/01906		PCT				
	WO 98/52224	11/19/98	PCT	H01L	23/48	Х	
	WO 99/14404		PCT				
	EPO 792517	10/22/03	EPO	H01R	9/00	Х	
	EPO 792519	3/26/03	EPO	1 H01R	9/00	Х	
	WO96/15458	5/23/96	PCT	G01R	1/073	Х	
	WO96/15459	5/23/96	PCT	G01R	1/073	Х	
	WO96/15551	5/23/96	PCT	H01R	21/60	Х	

Other Documents

Examiner		
Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
24		S. Towle, H. Braunisch, C. Hu, R. Emory, and G. Vandentop, <i>Bumpless Build-Up Layer Packaging</i> , Intel Corporation, Components Research, Presented at ASME International Mechanical Engineering Congress and Exposition (IMECE), New York, 12 November 2001
		Fundamentals of Contact Resistance, Part 1 – Contact Theory; Advanced probing Systems, Inc. Technical Bulletin – May 1999.
		Bergman, David; Forming Microvias; www.pcfab.com; Vol. 24. No. 3, March 2001.
		Composite Beams 5.11, pgs 301-305.
		Bell Labs Innovations; Lucent Technologies'Electroplating Chemicals & Services
		Venture Develops High-Performance Material For Connector Contacts; <u>www.bell-labs.com/news/1998/October/23/1.html</u> ; 1/15/2002.
		Levy, Larry; WaferProbe System, June 1997.
		Cobra; Probe Cards; Array Probe Card Product; pages 1-3; 11/9/2001.
		DuraProbe; DuraProbe Specifications; one page; 2001 Kulick & Soffa Industries, Inc.
		Intel Develops Breakthrough Packaging Technology; Intel Labs; 2002.
		Martinez, Steve TEA & John Pitts Motorola, Inc; Wafer Level Tech & Burn In; Accomplishments Challenges.
*		Packard Hughes; Science Over Art, Our New IC Membrane Test Probe

	Phillips, M.A.; Stress and microstructure evolution during initial growth of Pt on
-9X	amorphous substrates; J. Mater, Res., Vol. 15, No. 11, Nov 2000
000	International Technology Roadmap for Semiconductors; Executive Summary; 2001 Edition.
	International Technology Roadmap for Semiconductors; Assembly and Packaging; 2001 Edition.
	Santer, Erich, et al.; Adhesion and Deformation on a Microscopic Scale; Federal Institute for Material Research and Testing (BAM); D-1200 Berlin, Germany.
	D
	Renard, Stephane, et al.; Expanding MEMS with low-cost SOI wafers; 9/23/2002. Kim, Bong-Hwan, et al.; A Novel MEM Silicon Probe Card; 0-7803-7185-2/02;
	IEEE2002.
	Saha, Ranjana, et al.; Effects of the substrate on the determination of thin film mechanical properties by nanoindentation; Acta Materialia 50 (2002) 23-38.
	Kataoka, Kenichi, et al.; low contact-force and compliant MEMS probe card utilizing fritting contact; 0-7803-7185-2/02; 2002 IEEE.
	Bakir, Muhannad, et al.; Sol-Compliant Wafer-level Package Technologies; Semiconductor International April 2002.
	Schmelzer, H. Natter, Nanocrystalline nickel and nickel-copper alloys; J.Mater Res., Vol. 13, no. 5, May 1998.
	New Build-up HDI technique using copper bumps; Victory Circuit Co., Ltd. September 2002.
	Ho, M,-Y., et al. Morphology and Crystallization Kinetics in HfO2 Thin Films Grown by Atomic Layer Deposition; pp 1-18; 6/1/2002.
	Ho, My., et al.; Suppressed crystallization of Hf-gate dielectrics by controlled
	addition of Al2O3 using atomic layer deposition; pp 4218-4220; Applied Physics Letters; American Institute of Physics 2002.
	Kruger, C., et al.; Electroplated Micro-Springs for Demountable Chip Connections 13th European Conf, Sept. 12-15, 1999.
	Pena, David J.; et al. Electromechanical Synthesis of Multi Material; Mat. Res. Soc. Symp. VOL. 636, 2001 Materials Research Society.
	Myung, N.V., et al.; Electrodeposited Hard Magnetic Thin Films for MEMS; 6 th Int'l Symp on Magnetic Materials, PV 2000-29; 2002.
	Grosjean, Charles, et al.; A Practical Thermopneumatic Valve; Caltech EE 136-96; Pasadena, CA.
	Pham, N.P., et al.; A Micromachining Post-Process Module for RF Silicon Technology; Feldmannweg 17, 2628 CT Delft; 2000 IEEE.
	Strohm, K. M., et al.; Via hole technology for Microstrip Transmission; 1999 IEEE MTT-S Digest.
	Ok, Seong, Joon, et al.; High Aspect Ratio, Through-Wafer Electrical; IPACK'01 proceedings; July 8-13, 2001; Hawaii, USA.
	Li, Xinghua, et al.; High Density Electrical Feedthrough Fabricated; 0-7803-5998-4/01 IEEE 2001.
	Soh, Hyongsok T.; Ultra-Low Ressitance, Through-Wafer VIA (TWV) Technology; 1998 Int'l Conf. on Solid Sate Devices and Materials, Hiroshima,
	1998, pp 284-285.
	Artisan plating.com; Characteristics of electroplated rhodium finishes Chow, Eugene, et al.; Electrical Through-Wafer Interconnects for Released Silicon
	Sensors; Ginzton Lab, Stanford, CA
	Cheng, Ching H., et. al.; An Efficient Electrical Addressign Method using Through-Wafer Vias; Ginzton Lab, Stanford, CA.
	Anthony, T.R.; Diodes formed by laser drilling and diffusion; 1982 American Institute of Physics; J.Appl. Physics 53(12), December 1982.
	Ehrlich, Daniel J., et al.; Fabrication of Through-Wafer Via Conductors in Si by Laser; IEEE Transactions; 0148-6411/821200-0520, 1982 IEEE,

OX		Wu, Joyce H., et al.; A High Aspect-Silicon Substrate-Via technology and
20		Applications: Through-Wafer; 0-7803-6441-4/00; 2000 IEEE.
100		Anthony, T.R.; To fabricate electrical interconnections; 1981 American Institute of
1		Physics; J.Appl. Physics 52(8), August 1981.
		LESLIE, B. & MATTA, F., "membrane Probe Card Technology (The future for high
1		performance test)", ITC Proceedings, 1988, p.601
		BARSOTTI, c., TREMAINE, S., and BONHAM, M., "Very High Density Probing",
		ITC 1988, p 608
		SINGER, P. "The Dual Challenges of Wafer Probing", Semiconductor International,
	i	Dec. 1989
		JACOB, Gerald, "Contacting a Multitude of Miniscule Nodes", Evaluation
		Engineering, Aug. 1991
		NEWBOE, B., "The Probe Card Dilemma", Semiconductor International, Sept. 1992
		ZHANG, Yanwei "Design, Simulation, Fabrication and testing of Microprobes for a
1	1	New MEMS Wafer Probe Card", Dissertation, Dept. of Electrical and Computer
	į	Engineering, New Jersey Institute of Technology, May 1997
		Comtois John H., et al.: Fabricating Micro-Instruments in Surface-Micromachined
1 1		Polycrystalline Silicon; From the 43 rd Intl Instrumentation Symp., 1997.
-		Liu, Chang; Through-Wafer Electrical Interconnects by Sidewall Photolithographic
		Pattering; IEEE Tech Conf.May 19/21, 1998.
		Emery, R.; Novel Microelectronic Packaging Method for reduced Thermomechanica
1 1		Stresses on Low Dielectric Constant Materials; Advanced Metabolism Conf;
]]		Montreal, Canada 10/9/2001.
		Ma, Lunyu, et al.; J-Springs-Innovative Compliant Interconnects for Next-Generation
ł ł		Packaging, PARC, Inc. ECTC02002.
		Goldstein, Harry; Packages; Stacking different chips; IEEE Spectrum; August
		2001.
		Cheng, C. H., et al.; Electrical Through-Wafer Interconnects with Sub-PicoFarad
		Parasitic Capacitance; Publication from Ginzton Labs, Stanford, CA.
		Li, Xinghua, et al.; Fabrication of High-Density Electrical Feed-Throughs by Deep-
.	1	Reactive-Ion Etching of Pyrex Glass; Journal of Microelectromechanical Systems,
		Vol. 11, No. 6, December 2002.
		Chow, Eugene M.; Process Compatible Polysilicon-Based Electrical Through-Wafer
1		Interconnection in Silicon Substrates; Journal of Microelectromechanical Systems,
		Vol. 11, No. 6, December 2002.
7170		

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

5/27/05